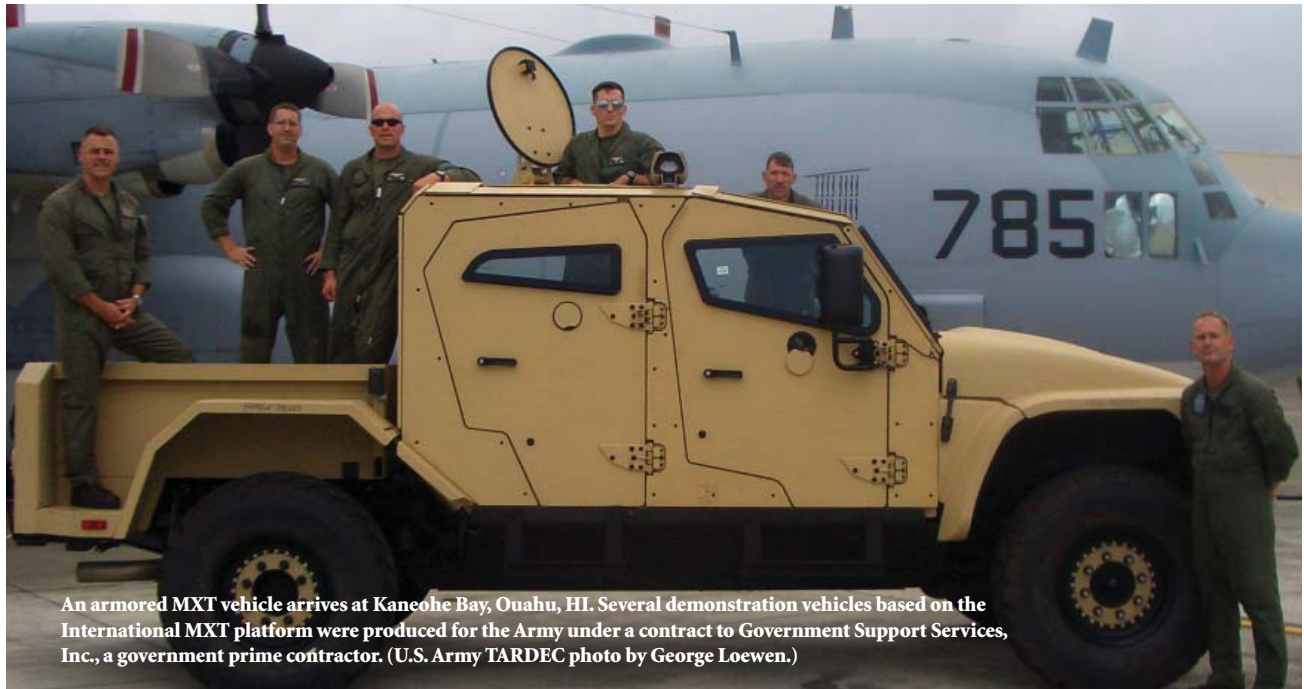


NAC and Industry Working Toward Improved Vehicle Platforms

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An armored MXT vehicle arrives at Kaneohe Bay, Oahu, HI. Several demonstration vehicles based on the International MXT platform were produced for the Army under a contract to Government Support Services, Inc., a government prime contractor. (U.S. Army TARDEC photo by George Loewen.)

The military and industry continue to build relationships to create products that are beneficial to both warfighters and consumers, and the U.S. Army Tank Automotive Research, Development and Engineering Center's (TARDEC's) National Automotive Center (NAC) are taking the lead when it comes to ground vehicle platforms. TARDEC follows guidance from the Army as a whole and focuses on Program Executive Office Strategic Thrusts at the U.S. Army TACOM Life Cycle Management Command to determine technology needs. This focus drives the definition of technological need thrust areas, which establishes part of the framework for the NAC's project and research and development (R&D) portfolio.

For NAC, industry encompasses ground vehicle manufacturers, their tier suppliers and independent engineering and testing resources, which are not, primarily, traditional military contractors. NAC uses its partnerships with the automotive industrial base to discover the latest commercial technologies as they are being developed by original equipment manufacturers, tier suppliers and independent entrepreneurs. By working in partnership with these developers, NAC can influence the basic design and integration requirements so that the finished products are applicable to military and commercial customers with the highest degree of commonality and thus the lowest expected cost.

Although military applications for these developing "dual use" technologies are sometimes difficult to imagine, this is where the NAC's mission is focused.

By recognizing these technologies' value and impact early on, NAC effectively leverages its all-encompassing experience with complete vehicle platforms during the initial development stages. NAC blends selected technologies into vehicle platforms that are then used as demonstrators by the end-user communities. User evaluation results provide the impetus for commercially based technologies, achieving a new capability level that supports Soldiers' emerging mission needs. TARDEC programs that support Army needs can then access the results and incorporate these technologies into their planning and implementation schedules.

Southeast Michigan is the U.S. automotive industry's bastion, including the major auto manufacturers and their major tier supply partners. Many of the industry's most



Drivers test an Integrated Concepts & Research Corporation (ICRC) LASSO® vehicle scaling a severe, off-road track with a rock step incline. Through various agreements, NAC collaborates with numerous end users by providing them with full-platform demonstrators to expose and verify the emerging technology's utility and possible value to Soldiers. (Photo courtesy of ICRC.)

pertinent technological developments are initiated within this core community. Medium- and heavy-duty commercial truck manufacturers, although not located primarily in Michigan, are also part of the industrial base with which NAC collaborates. Many of the tier supply partners are common to both ground vehicle communities. Additionally, many medium-duty truck platforms share common roots with the automotive manufacturers.

NAC's interface with industry takes many forms, such as society/association memberships (Society of Automotive Engineers (SAE) and National Defense Industrial Association), user forums, university research support programs (Oakland University, Lawrence Technological University and Michigan State University) and other

outreach programs (Automation Alley® and Focus: HOPE). NAC is a contributing member to SAE, a primary body for collaboration with the automotive community, through participation in standards committees, publication of papers and sponsorship of displays. NAC has also initiated partnership with the truck industry in many ways, including membership in the Truck Maintenance Council and Hybrid Truck Users Forum. Ongoing partnerships through Cooperative Research and Development Agreements and Small Business Innovation

Research efforts also provide NAC with access to additional technologies while they are being formed strategically.

Through various agreements, NAC collaborates with numerous end users by providing them with full-platform demonstrators to expose and verify the emerging technology's utility and possible value to Soldiers. Collaboration agreements such as memoranda of agreement document a given project's mutual and unique goals. By putting them to use at various sites, limited user evaluations also impel further technology refinement.

The user communities evaluate the demonstrators through a combination of static displays and dynamic ride-drive demonstrations at venues that include trade shows, industry and Army test sites, training bases, National Guard venues and contractor-designated sites. As development matures through demonstration iterations, limited testing is sometimes used to reach specific technology readiness levels. This may be at the component-, sub-system or full-system level, depending on TARDEC's or the end user's project needs. Recently, these full platforms have included vehicles such as the International MXT, Land and Sea Special Operations (LASSO), Joint All-terrain Modular Mobility Asset (JAMMA), light utility hybrid, hybrid-electric Gator and others.

There are instances where NAC works with industry



MillenWorks' Light Utility Vehicle is being mobility tested in the Southern California mountains. By working in partnership with these vehicle manufacturers and developers, NAC can influence the basic design and integration requirements so that the finished products are applicable to military and commercial customers with the highest degree of commonality and thus the lowest expected cost. (Photo courtesy of MillenWorks.)



An unarmored MXT vehicle being tested for ride quality in TARDEC's Physical Simulation Lab in Warren, MI. NAC collaborates with numerous end users by providing them with full-platform demonstrators to expose and verify an emerging technology's utility and possible value to Soldiers. (U.S. Army TARDEC photo by George Loewen.)

to develop technologies for the Army and other Department of Defense customers so that a current need can be filled by a commercial off-the-shelf (COTS) solution due to an Army decision not to fund a particular approved requirement through the standard Program Objective Memorandum (POM) budgetary process. NAC will then collaborate with industry partners to develop a COTS-based solution to meet existing military or other government agency requirements.

LASSO Vehicle

One such instance is the LASSO vehicle, under development by Integrated Concepts and Research Corporation, a subsidiary of VSE Corporation. This vehicle is aimed at supplanting and/or supplementing the commercial solutions in the field today, such as all-terrain vehicles (ATVs) and motorcycles, with more robust, higher-performing technology based on the Light Utility Mobility Enhancement Requirements Document and Lightweight Tactical All-Terrain Vehicle's requirements. The ultimate intent is to demonstrate the technology's performance and utility to influence

the user and requirements community, resulting in a budgeted, POM Program of Record. The benefit to the user is a system that is supportable and better performing and has a longer service life than current commercial solutions.

The LASSO vehicle is a purpose-built, high-capacity, 6-wheeled, ATV-type vehicle. The vehicle, which is off-road capable, is designed to be used as a cargo support vehicle in combat support and combat service support roles to fill the mission gap between Soldiers on foot and High Mobility Multipurpose Wheeled Vehicles. Its unique, continuously variable transmission with fully independent suspension enables the vehicle to maneuver over all types of terrain and grades. Its cab and cargo were designed for ease of separation to allow for servicing the engine power pack and removing the roll bar for transportability in the V-22 Osprey aircraft as well as Family of Medium Tactical Vehicles.

JAMMA Vehicle

There are other instances where industry reacts to military

requirements as they continuously evolve. An example of this is the JAMMA vehicle project. The JAMMA vehicle is a commercially based proposed solution to the Internally Transportable Vehicle Joint Operational Requirements Document's requirement to fill the mission gap for a Joint service-level, V-22 aircraft-transportable vehicle. Although all services may have a common mission gap, their differing and unique mission needs make it challenging to fill these gaps.

For the Army, several demonstration vehicles based on the International MXT platform were produced under a contract to Government Support Services, Inc., a government prime contractor. After running several initial demonstration tests to determine mission capability and Federal Motor Vehicle Safety Standards and Regulatory compliance, these vehicles have been deployed to several user communities to better understand requirements and capabilities.

These platforms have also been equipped with secondary technologies such as seat-mounted seat belts, magnetic-rheological shock absorbers, integrated communications packages and a laser-powered night vision system. Vehicles are now in use by Michigan, Indiana and California National Guard units, the U.S. Marine Corps Experimentation Center and the U.S. Air Force.

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